WHAT IS CLAIMED:

1.   A computerized method for authenticating an electronic file, the method comprising the steps of:

receiving an electronic file having a graphical content;

5   generating an object level representation of the graphical content; and

adding authentication information to the electronic file based on the object level representation of the graphical content.

2.   The method of claim 1 wherein the graphical content contains binary pixel bit values.

3.   The method of claim 1 further comprising the step of converting the graphical content into a symbolic representation of the graphical content.

4.   The method of claim 3 further comprising the steps of:

defining nodes of the graphical content with specification symbols; and

defining relationships between the nodes of the graphical content with relationship symbols.

5.   The method of claim 4 further comprising the step of defining the shape, size, color, and position of the nodes.

6.   The method of claim 4 further comprising the step of defining conditions and familial relationships between the nodes.

7.   The method of claim 1 further comprising the step of authenticating the object level representation with a text authentication algorithm.

8.   The method of claim 7 further comprising the step of authenticating the object level representation with a checksum.

9.   The method of claim 8 wherein the checksum is a two-dimensional checksum.

10.   The method of claim 8 wherein the checksum is a multi-dimensional checksum.

11.   The method of claim 7 further comprising the step of authenticating the object level representation with a cryptographic hash function.

12.   The method of claim 1 further comprising the step of authenticating the graphical content at a pixel level.

13.   The method of claim 12 further comprising the step of adding visible authentication information to the graphical content.

14.   The method of claim 13 wherein the visible authentication information includes a bounding box.

15.   The method of claim 13 wherein the visible authentication information includes a bar code.

16.   The method of claim 12 further comprising the step of adding invisible authentication information to the graphical content.

17.   The method of claim 1 further comprising the step of partitioning the electronic file into graphical content and textural content.

18. A computerized method for authenticating a binary graph, the method comprising the steps of:

authenticating the graph at a pixel level;

authenticating the graph at an object level; and

5   transmitting the authenticated graph to a recipient.

19. The method of claim 18 further comprising the step of adding visible authentication information to the graph.

20. The method of claim 19 further comprising the steps of:
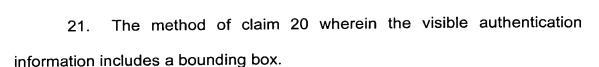
forming a truncated image from the graph;

generating an initial message from the truncated image, the initial message defined by all bits of the truncated image;

5   converting the initial message into a padded message, the padded message having a size defined by a multiple of a predetermined length;

computing a hash value for the padded message;

converting the hash value into a public key encrypted message; and

converting the public key encrypted message into the visible

10   authentication information.

21. The method of claim 20 wherein the visible authentication information includes a bounding box.

22. The method of claim 20 wherein the visible authentication information includes a bar code.

23. The method of claim 18 further comprising the step of adding invisible authentication information to the graph.

24. The method of claim 23 further comprising the steps of:

forming a truncated image from the graph;

selecting a verification bit from each pixel of the truncated image;

generating an initial message from the truncated image, the initial

5   message defined by all non-verification bits of the truncated image;

converting the initial message into a padded message, the padded message having a size defined by a multiple of a predetermined length;

computing a hash value for the padded message;

converting the hash value into a public key encrypted message; and

10   embedding the public key encrypted message into the truncated image.

25. The method of claim 24 further comprising the step of maximizing spread between the verification bits.

26. The method of claim 18 further comprising the step of authenticating a symbolic representation of the graph with a text authentication algorithm.

27. The method of claim 26 further comprising the steps of:

defining nodes of the graph with specification symbols; and

defining relationships between the nodes of the graph with relationship symbols.

28. The method of claim 26 further comprising the step of coalescing the object level of the graph with the pixel level of the graph.

29. A graph authentication system comprising:

an object level authenticator for authenticating a graph at an object level;

a pixel level authenticator for authenticating the graph at a pixel level;

5 and

an encryption system for encrypting the authenticated graph.

30. The authentication system of claim 29 wherein the object level authenticator converts the graph into a symbolic representation of the graph.

31. The authentication system of claim 30 wherein the object level authenticator includes:

a specification module for defining nodes of the graph with specification symbols;

5 a relationship module for defining relationships between the nodes of the graph with relationship symbols; and

a text authentication module for authenticating the symbolic representation with a text authentication algorithm.

32.   The authentication system of claim 29 wherein the pixel level authenticator includes:

a visible watermarking module for adding visible authentication information to the graph; and

5   an invisible watermarking module for adding invisible authentication information to the graph.

33.   The authentication system of claim 32 wherein the pixel level authenticator further includes a coalescing module for embedding a hash value from the object level of the graph in the pixel level of the graph.